

APPENDIX A

CLEAN SET OF CLAIMS AS AMENDED

- 1 1. (Amended) A method of processing a video stream, comprising:
 - 2 (a) detecting a request to randomly access a particular frame;
 - 3 (b) maintaining a list of frame dependencies identifying at least a set of frames
4 required to decode the particular frame; and
 - 5 (c) determining base at least in part on the list of frame dependencies whether a
6 decoded version of the particular frame is in a decoded frame cache, and if it is not and
7 if the particular frame has a frame dependency:
 - 8 (i) determining a frame dependency for the particular frame;
 - 9 (ii) determining which of the frames in the frame dependency are in the
10 decoded frame cache;
 - 11 (iii) decoding any frame in the frame dependency that is not in the
12 decoded frame cache and placing it in the decoded frame cache; and
 - 13 (iv) using at least one of the decoded frames in the frame dependency to
14 decode the particular frame to create a decoded version of the particular frame.
- 15
16 2. (Amended) The method of claim 1, wherein the request to playback a
17 particular frame is part of a request to perform frame-by-frame backward playback and
18 part (c) is performed for successively earlier frames with respect to the particular frame
19 as part of the frame-by-frame backward playback.
20
- 21 3. (Unchanged) The method of claim 1, wherein part (i) is performed whether
22 or not it is determined that a decoded version of a particular frame is in the decoded
23 frame cache without part (iv) being performed.
24
- 25 4. (Unchanged) The method of claim 1, wherein the particular frame may be
26 an I, P, or B frame of MPEG compressed video.
27

1 5. (Unchanged) The method of claim 1, wherein the frame dependency is an
2 immediate frame dependency.

3
4 6. (Amended) The method of claim 5, wherein the at least some of the
5 decoded frames referred to in part (iv) are those frames in the immediate dependency.

6
7 7. (Amended) The method of claim 5, wherein part (c) includes recursion
8 where frames in the immediate frame dependency of the frame of interest are not in the
9 decoded frame cache.

10
11 8. (Amended) The method of claim 1, wherein part (c) includes a loop with
12 a terminating condition that all frames on which the particular frame is dependent have
13 been decoded.

14
15 9. (Unchanged) The method of claim 1, wherein decoded frames are
16 replaced in the decoded frame cache according to a least recently used policy.

17
18 10. (Unchanged) The method of claim 1, wherein an index is used to
19 represent each frame in the frame dependency.

20
21 11. (Unchanged) The method of claim 1, wherein the frame dependency is
22 determined through a look-up table.

23
24 12. (Unchanged) The method of claim 11, wherein the frame dependency is
25 determined through successive uses of a look-up table.

26
27 13. (Unchanged) The method of claim 1, wherein the decoded frame cache
28 includes a data structure.

29
30 14. (Unchanged) The method of claim 1, wherein the decoded frame cache
31 includes a section of main memory.

1
2 15. (Amended) An article comprising:
3 a computer readable medium having instructions thereon which when executed
4 cause a computer to:

- 5 (a) detect a request to randomly access a particular frame; and
6 (b) maintaining a list of frame dependencies identifying at least a set of frames
7 required to decode the particular frame;
8 (c) determine base at least in part on the list of frame dependencies whether a
9 decoded version of the particular frame is in a decoded frame cache, and if it is not and
10 if the particular frame has a frame dependency:
11 (i) determine a frame dependency for the particular frame;
12 (ii) determine which of the frames in the frame dependency are in the
13 decoded frame cache;
14 (iii) decode any frame in the frame dependency that is not in the decoded
15 frame cache and place it in the decoded frame cache; and
16 (iv) use at least and of the decoded frames in the frame dependency to
17 decode the particular frame to create a decoded version of the particular frame.

18
19 16. (Amended) The article of claim 15, wherein the request to playback a
20 particular frame is part of a request to perform frame-by-frame backward playback and
21 part (c) is performed for successively earlier frames with respect to the particular frame
22 as part of the frame-by-frame backward playback.

23
24 17. (Unchanged) The article of claim 15, wherein part (i) is performed whether
25 or not it is determined that a decoded version of a particular frame is in the decoded
26 frame cache without part (iv) being performed.

27
28 18. (Unchanged) The article of claim 15, wherein the frame dependency is an
29 immediate frame dependency.
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1 19. (Amended) The article of claim 18, wherein the at least some of the
2 decoded frames referred to in part (iv) are those frames in the immediate dependency.

3
4 20. (Amended) The article of claim 18, wherein part (c) includes recursion
5 where frames in the immediate frame dependency of the frame of interest are not in the
6 decoded frame cache.

7
8 21. (Amended) The article of claim 15, wherein part (c) includes a loop with
9 a terminating condition that all frames on which the particular frame is dependent have
10 been decoded.

11
12 22. (Unchanged) The article of claim 15, wherein decoded frames are
13 replaced in the decoded frame cache according to a least recently used policy.

14
15 23. (Unchanged) The article of claim 15, wherein an index is used to represent
16 each frame in the frame dependency.

17
18 24. (Unchanged) The article of claim 15, wherein the frame dependency is
19 determined through a look-up table.

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21 25. (Unchanged) The article of claim 24, wherein the frame dependency is
22 determined through successive uses of a look-up table.

23
24 26. (Amended) A computer system including:
25 a processor and video processing circuitry;
26 a display; and
27 memory including instructions which when executed cause the processor and
28 video processing circuitry to:

29 (a) detect a request to randomly access a particular frame; and
30 (b) maintain a list of frame dependencies identifying at least a set of frames
31 required to decode the particular frame;

1 (c) determine whether a decoded version of the particular frame is in a decoded
2 frame cache, and if it is not and if the particular frame has a frame dependency:

3 (i) determine a frame dependency for the particular frame;

4 (ii) determine which of the frames in the frame dependency are in the
5 decoded frame cache;

6 (iii) decode any frame in the frame dependency that is not in the decoded
7 frame cache and place it in the decoded frame cache; and

8 (iv) use at least one of the decoded frames in the frame dependency to
9 decode the particular frame to create a decoded version of the particular frame.

10 (d) provide the decoded version of the particular frame for displaying on the
11 display.

12
13 27. (Amended) A method for randomly accessing a first frame of a video
14 stream, comprising:

15 maintaining a list of frame dependencies identifying at least a set of frames
16 required to decode the first frame;

17 determining a decoding of the first frame is not in a decoded frame cache;

18 determining, based at least in part on the list of frame dependencies, a first frame
19 dependency for the first frame comprising frames required to decode the first frame;

20 decoding at least one of the frames of the frame dependency not present in the
21 decoded frame cache, and placing it in the decoded frame cache; and

22 decoding the first frame using at least one of the decoded frames in the decoded
23 frame cache.

24
25 28. (Unchanged) The method of claim 27, further comprising:

26 decoding each frame of the frame dependency not present in the decoded frame
27 cache, and placing them in the decoded frame cache.

28
29 29. (Unchanged) The method of claim 27, further comprising:

30 recursively decoding the second frame of the frame dependency.

1 30. (Unchanged) A method according to claim 27 for reverse playback of
2 frames of the video stream, comprising:
3 determining a second frame is not in the decoded frame cache, the second frame
4 following the first frame in the video stream;
5 determining a second frame dependency for the second frame comprising
6 frames required to decode the second frame;
7 decoding at least one of the frames of the frame dependency not present in the
8 decoded frame cache, and placing it in the decoded frame cache; and
9 decoding the second frame using at least one of the decoded frames in the
10 decoded frame cache.

11
12 31. (Unchanged) The method of claim 30, further comprising:
13 playing the second frame and then the first frame.

14
15 32. (Unchanged) The method of claim 30, wherein the second frame is an
16 immediately following frame of the first frame.

17
18 33. (Amended) An article comprising a machine-accessible media having
19 associated data for randomly accessing a first frame of a video stream, wherein the
20 data, when accessed, results in a machine performing:
21 maintaining a list of frame dependencies identifying at least a set of frames
22 required to decode the first frame;
23 determining a decoding of the first frame is not in a decoded frame cache;
24 determining, based at least in part on the list of frame dependencies, a first frame
25 dependency for the first frame comprising frames required to decode the first frame;
26 decoding at least one of the frames of the frame dependency not present in the
27 decoded frame cache, and placing it in the decoded frame cache; and
28 decoding the first frame using at least one of the decoded frames in the decoded
29 frame cache.

1 34. (Unchanged) The article of claim 33 wherein the machine-accessible
2 media further includes data, when accessed, results in the machine performing:
3 decoding each frame of the frame dependency not present in the decoded frame
4 cache, and placing them in the decoded frame cache.

5
6 35. (Unchanged) The article of claim 33 wherein the machine-accessible
7 media further includes data, when accessed, results in the machine performing:
8 recursively decoding the second frame of the frame dependency.

9
10 36. (Unchanged) The article of claim 33 wherein the machine-accessible
11 media further includes data for reverse playback of frames of the video stream, when
12 accessed, results in the machine performing:
13 determining a second frame is not in the decoded frame cache, the second frame
14 following the first frame in the video stream;
15 determining a second frame dependency for the second frame comprising
16 frames required to decode the second frame;
17 decoding at least one of the frames of the frame dependency not present in the
18 decoded frame cache, and placing it in the decoded frame cache; and
19 decoding the second frame using at least one of the decoded frames in the
20 decoded frame cache.